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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,862	03/16/2005	Nicholas Michael Ian Noble	NL 020928	9313

24737 7590 01/07/2009

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
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EXAMINER	
RASHID, DAVID	
ART UNIT	PAPER NUMBER
2624	
MAIL DATE	DELIVERY MODE
01/07/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,862	NOBLE ET AL.	
	Examiner	Art Unit	
	DAVID P. RASHID	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *September 11, 2008* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 11-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 11-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

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Continued Examination Under 37 CFR 1.114

[1] A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 11, 2008 has been entered.

Amendments & Claim Status

[2] This office action is responsive to the AMENDMENT and/or RESPONSE under 37 C.F.R. s. 1.116 – Expedited Procedure received on September 11, 2008. Claims 1-6 and 11-21 remain pending; claims 7-10 cancelled; claims 17-21 new.

Drawings

[3] The replacement drawings were received on September 11, 2008 and are acceptable. In response to the Amendments to the drawing figures received on September 11, 2008 the previous drawing objections are withdrawn.

Response to Arguments

[4] Remarks/Discussion of issues filed September 11, 2008 with respect to claims 1-6 and 11-21 have been respectfully and fully considered, bur are not found persuasive.

Summary of Remarks regarding Rejections under 35. U.S.C. § 102

> . . .Further, Applicants respectfully disagree that determining a minimum energy solution for points on a closed contour discloses a fitting operation between images, simply because the determination apparently incorporates other snake points of the contour.
>
> Further, with respect to the fitting operation, claim 1 recites that the transformation of further images of the first series of images fits the first image to each further image. The Final Office Action asserts that this feature is disclosed by frames in a sequence being ultimately transformed based on the initial fit of the first frame's boundary, stating "since frame N depended from frame N-l, ..., frame 3 depended from frame 2, frame 2 depended from frame 1 ." *See* Office Action, p. 6. However, assuming only for the sake of argument that the alleged transformations constitute a fitting operation, this sequence at best would disclose fitting successive pairs of images, not fitting the first image to each of the images.
>
> . . .
>
> Accordingly, Applicants submit that the applied art fails to disclose at least one feature of claim 11 for substantially the same reasons as discussed above with respect to claim 1.

Applicant's Remarks/Discussion of issues at 11-12, September 11, 2008.

However, the Examiner has broadly and reasonably interpreted "a fitting operation" as an operation that performs the act of "fitting" between the two images in question. A fitting operation could thus be an operator to overlay and match two successive images, an operator that simply makes them successive to fit in time, or as the prior art discloses the operator that creates snake contours the are used from the previous image that fit in the next successive image for segmentation purposes. The Examiner suggests further limiting "a fitting operation" to further differentiate from the prior art of record.

The active contour using snake points to segment and "fit" do in fact so for successive pairs of images as Applicant has correctly pointed out. However, fitting does occur from image 1 to image N in that image N depends on the fittings from image 1 though image N-1. The fitting of image N cannot occur unless the fitting of image 1 was first performed, and it would be plausible to say any successive image fits with every previous image.

Claim 11 is rejected for the reasons given immediately above for claim 1.

Summary of Remarks regarding Rejections under 35. U.S.C. § 103

> Claims 4 and 14 were rejected under 35 U.S.C. 103(a) as being obvious over MALASSIOTIS et al. in view of QIAN (U.S. Patent No. 5,381,791). Applicants respectfully traverse the rejections for at least the reasons set forth below.
>
> The Examiner relies on QIAN to teach only series of images being collected with different means of monitoring. QIAN therefore does not cure the deficiencies of MALASSIOTIS et al., discussed above with respect to independent claims 1 and 11.
>
> . . .
>
> Claims 6, 10 and 16 were rejected under 35 U.S.C. 103(a) as being obvious over MALASSIOTIS et al. in view of SHEEHAN et al. (U.S. Patent No. 5,435,310). Applicants respectfully traverse the rejections for at least the reasons set forth below.
>
> The Examiner relies on SHEEHAN et al. to teach only converting a series of images showing walls of an organ in a flat plane, etc. SHEEHAN et al. therefore does not cure the deficiencies of MALASSIOTIS et al., discussed above with respect to independent claims 1 and 11.

Remarks/Discussion of issues at 13.

However, the claims from which claims 4 and 14 depend are properly rejected and contain no deficiencies for which *Qian* is expected to cure.

The rejections of claims 6 and 16 have been modified to include the images created using the ellipse-detection (e.g., fig. 1) results (created before the active-contour algorithm for segmentation purposes as shown in fig. 5) when the claims further incorporate "modified first series of images" in claim 6, 16 and "original series of images" in claim 20.

Claim Rejections - 35 USC § 101

[5] 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Judicial Exception – Abstract Idea

Claims 11-21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

A judicial exception claim is non-statutory for solely embodying an abstract idea, natural phenomenon, or law of nature. *See* M.P.E.P. § 2106(IV)(C)(2). However, a practical application of a judicial exception claim is a § 101 statutory claim "when it:

(A) 'transforms' an article or physical object to a different state or thing [(*i.e.*, a physical transformation, see below)]; or

(B) otherwise produces a useful, concrete and tangible result, based on the factors discussed below. . . ." *Id.*

§ 101 statutory transformations of intangible articles or physical objects must be physical transformations (*i.e.*, a physical component to the transformation must be involved). [1]

In Re Bilski – "Tied To" Criteria

[6] In addition with respect to **claims 11-21**, while the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing.[2]

While the instant claims recite a series of steps or acts to be performed, the claims neither transform underlying subject matter not positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Claim Rejections - 35 USC § 112

[7] In response to the Amendments to the claims received on September 11, 2008, the previous § 112 rejections are withdrawn.

[1] *See* M.P.E.P. § 2106(IV)(C)(2) (requiring the element "provides a transformation or reduction of an article to a different state of thing", a "practical application by physical transformation") *and* Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility, Official Gazette notice, 22 November 2005, Annex (II)(B)(iii); (III).

[2] *See* Clarification of "Processes" under 35 U.S.C. 101, Deputy Commissioner for Patent Examining Policy, John J. Love, May 15, 2008; *available at* http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/section_101_05_15_2008.pdf *and In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

Claim Objections

[8] In response to the Amendments to the claims received on September 11, 2008, the previous claim objections are withdrawn.

Claim Rejections - 35 USC § 102

[9] The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Malassiotis et al.

[10] **Claims 1-3, 5-9, 11-13,** and **15-21** are rejected under 35 U.S.C. 102(b) as being anticipated by Tracking the Left Ventricle in Echocardiographic Images by Learning Heart Dynamics, IEEE Transactions on Medical Imaging, Vol. 18, No. 3, 3/1999, pp. 282 – 290 (published March 1999, hereinafter "Malassiotis et al.").

Regarding **claim 1**, *Malassiotis et al.* discloses an apparatus (the computer used to perform the steps) for segmenting a series of 2D (p. 287) or 3D images obtained of a target object within a patient ("heart ventricle" in section I, left column, p. 282) comprising:

a segmenter (the computer used to perform the steps) for performing a first segmentation (the segmentation in fig. 5a) on a first image (fig. 5a is a first image; "…first frame of the sequence." in section I, left column, p. 283) of a first series of images (fig. 5a through fig. 5f is a series of images) the first segmentation (the segmentation in fig. 5a) being used for subsequent segmentation of a remainder of images of said first series of images ("…this basis is used to

constrain the motion of the active contour in subsequent frames…" in section I., left column, p. 283; i.e., fig. 5b-g segmentation is depended on fig. 5a segmentation),

a transform calculator (the computer used to perform the steps) for performing a series of transformations (fig. 2, right column, p. 284; fig. 3, p. 285 wherein the transformation switching from the old set to the new set of snake points using contour tracking) wherein each transformation comprises a fitting operation ("minimum energy solution" in right column, p. 284; section "B. Explicitly Constraining Snake Energy" on p. 286) between two images (e.g., fig. 5a and 5b) of said first series of images (fig. 5a through fig. 5f is a series of images),

wherein the first segmentation (the segmentation in fig. 5a) on the first image (fig. 5a is a first image; "…first frame of the sequence." in section I, left column, p. 283) of the first series of images (fig. 5a through fig. 5f is a series of images) is modified and subsequently applied to the transformation of each further image (fig. 5b through fig. 5f are further images; "…this basis is used to constrain the motion of the active contour in subsequent frames…" in section I, left column, p. 283 wherein all further frames in the sequence are ultimately transformed based on the initial fit of the first frame's boundary (since frame N depended from frame N – 1,…,frame 3 depended from frame 2, frame 2 depended from frame 1)) of the first series of images (fig. 5a through fig. 5f is a series of images) that fits the first image (fig. 5a is a first image) to said further image (fig. 5b through fig. 5f are further images) of the first series of images (fig. 5a through fig. 5f is a series of images).

Regarding **claim 2**, *Malassiotis et al.* discloses wherein each transformation relates to adjacent successive images (fig. 5b through fig. f are "adjacent" and "successive" with respect to time) it is suggested by fig. 4 that every frame in the sequence undergoes contour tracking transformation; "[t]he boundary obtained at a specific time instance was simply used as an initial value at the subsequent time instance" on p. 288) of the first series of images (fig. 5a through fig. 5f is a series of images).

Regarding **claim 3**, *Malassiotis et al.* discloses wherein the segmentation of the first series of images (fig. 5a through fig. 5f is a series of images) is applied to a second series of images (all subsequent images of the first series of images fig. 5a through fig. 5f) in addition to the first series of images (fig. 5a through fig. 5f is a series of images).

Regarding **claim 5**, *Malassiotis et al.* discloses wherein the first (fig. 5a through fig. 5f is a series of images) and second series of images (all subsequent images of the first series of images fig. 5a through fig. 5f) are collected at different times (the image is successive in time and thus the second series must proceed the first; and thus collected at different times, the second series being collected after the first).

Regarding **claim 6**, *Malassiotis et al.* discloses apparatus according to claim 1, wherein the images relate to a sphere-like organ (e.g., the heart) and prior to establishing the first series of transformations (fig. 5a through fig. 5f is a series of images), the first series of images is converted to a modified first series of images (fig. 5a through fig. 5f is a series of images is a modified series of images in that it was taken from an original series of images using ellipse-detection as shown in fig. 1, and prior to active contour algorithm in fig. 5) showing walls of the organ in a flat plane the contours from the segmentation is an outline attempt of the wall of a heart in a flat plane) wherein opposing sides of said plane correspond to an inside and an outside of said organ (the contours from the segmentation is an outline of the heart from which both an outside and inside exist on either side), and that the said series of transformations (fig. 5a through fig. 5f is a series of images) are applied to the first modified series of images (e.g., fig. 1 ellipse-detection is needed prior to the segmentation using active contour in 5a through fig. 5f).

Regarding **claim 11**, claim 1 recites identical features as in claim 11. Thus, references/arguments equivalent to those presented above for claim 1 are equally applicable to claim 11.

Regarding **claim 12**, claim 2 recites identical features as in claim 12. Thus, references/arguments equivalent to those presented above for claim 2 are equally applicable to claim 12.

Regarding **claim 13**, claim 3 recites identical features as in claim 13. Thus, references/arguments equivalent to those presented above for claim 3 are equally applicable to claim 13.

Regarding **claim 15**, claim 5 recites identical features as in claim 15. Thus, references/arguments equivalent to those presented above for claim 5 are equally applicable to claim 15.

Regarding **claim 16**, claim 6 recites identical features as in claim 16. Thus, references/arguments equivalent to those presented above for claim 6 are equally applicable to claim 16.

Regarding **claim 17**, *Malassiotis et al.* discloses a method for segmenting a series of 2D (p. 287) or 3D images, the method comprising:

performing a first segmentation of a first image (fig. 5a is a first image; "…first frame of the sequence." in section I, left column, p. 283) of the series of images (fig. 5a through fig. 5f is a series of images) to obtain a first segmented image (the segmentation in fig. 5a) according to a selected segmentation process (e.g., fig. 2 estimation of snake points);

calculating a transformation (fig. 2, right column, p. 284; fig. 3, p. 285 wherein the transformation switching from the old set to the new set of snake points using contour tracking) of the first image (fig. 5a is a first image) and a successive second image (fig. 5b is a successive second image) of the series of images (fig. 5a through fig. 5f is a series of images) to determine a best fit (the new set of snake points using contour tracking is a best fit operation that is performed on all images fig. 5a through fig. 5f) of the first image (fig. 5a is a first image that is included) and the second image (fig. 5b is a second image that is included); and

converting the first segmented image (the segmentation in fig. 5a) and the calculated transformation (fig. 2, right column, p. 284; fig. 3, p. 285 wherein the transformation switching from the old set to the new set of snake points using contour tracking) of the first and second images into a second segmented image (the segmentation in fig. 5b; the second segmented image is directly dependent on the segmentation of the first image) corresponding to the second image (fig. 5b is a second image).

Regarding **claim 18**, *Malassiotis et al.* discloses the method of claim 17, further comprising:

calculating a transformation (fig. 2, right column, p. 284; fig. 3, p. 285 wherein the transformation switching from the old set to the new set of snake points using contour tracking) of the first image (fig. 5a is a first image) and a third image (fig. 5c is a third image) of the series of images (fig. 5) to determine a best fit (the new set of snake points using contour tracking is a best fit operation that is performed on all images fig. 5a through fig. 5f) of the first image (fig. 5a is a first image) and the third image (fig. 5c is a third image); and

converting the first segmented image (the segmentation in fig. 5a) and the calculated transformation (fig. 2, right column, p. 284; fig. 3, p. 285 wherein the transformation switching from the old set to the new set of snake points using contour tracking) of the first and third images into a third segmented image (the segmentation in fig. 5c; the third segmented image is directly dependent on the segmentation of both the first and second image) corresponding to the third image (fig. 5c is a second image).

Regarding **claim 19**, *Malassiotis et al.* discloses the method of claim 17, further comprising:

calculating a transformation (fig. 2, right column, p. 284; fig. 3, p. 285 wherein the transformation switching from the old set to the new set of snake points using contour tracking) of the second image (fig. 5b is a second image) and a successive third image (fig. 5c is a third image) of the series of images (fig. 5) to determine a best fit (the new set of snake points using contour tracking is a best fit operation that is performed on all images fig. 5a through fig. 5f) of the second image (fig. 5b is a second image) and the third image (fig. 5c is a third image); and

converting the first segmented image (the segmentation in fig. 5a) and the calculated transformation (fig. 2, right column, p. 284; fig. 3, p. 285 wherein the transformation switching from the old set to the new set of snake points using contour tracking) of the second and third images into a third segmented image (the segmentation in fig. 5c; the third segmented image is directly dependent on the segmentation of both the first and second image) corresponding to the third image (fig. 5c is a second image).

Regarding **claim 20**, *Malassiotis et al.* discloses the method of claim 17, further comprising:

converting the series of images (fig. 5a through fig. 5f is a series of images) from an original series of images (e.g., fig. 1 ellipse-detection is needed prior to the segmentation using active contour in 5a through fig. 5f) prior to segmenting the first image,

wherein each image of the series of images (fig. 5a through fig. 5f is a series of images) comprises a wall of an organ in a flat plane (the contours from the segmentation is an outline attempt of the wall of a heart in a flat plane), opposing sides of the wall respectively corresponding to include and outside of an organ (the contours from the segmentation is an outline of the heart from which both an outside and inside exist on either side).

Regarding **claim 21**, *Malassiotis et al.* discloses the method of claim 20, wherein converting the series of images (fig. 5a through fig. 5f is a series of images) from the original series of images (e.g., fig. 1 ellipse-detection is needed prior to the segmentation using active contour in 5a through fig. 5f) comprises a resample operation (the ellipsoid points are "discretized" and broken into finite points as shown in fig. 2 when contour tracking occurs using snake points).

Claim Rejections - 35 USC § 103

[11] The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Malassiotis et al. in view of Qian

[12] **Claims 4** and **14** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Malassiotis et al.* in view of U.S. Patent No. 5,381,791 (issued Jan. 17, 1995, hereinafter "Qian").

Regarding **claim 4**, while *Malassiotis et al.* discloses an apparatus according to claim 4, wherein each of the first and second series of images is collected with ultrasound (US) means (p. 287), *Malassiotis et al.* does not teach the series of images collected from one of means of monitoring selected from a group magnetic resonance (MR), computed tomography (CT), and nuclear medicine (NM).

Qian teaches automatic identification of anatomical features of interest that includes a series of images collected from one of means of monitoring selected from a group magnetic resonance (MR), computed tomography (CT), and nuclear medicine (NM) (1:10-29).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the apparatus of *Malassiotis et al.* to include series of images collected from one of means of monitoring selected from a group magnetic resonance (MR), computed tomography (CT), and nuclear medicine (NM) as taught by *Qian* as CT and MR "produce clearly defined

images", Qian, 1:16-17 and NM "to provide method and apparatus which can automatically identify anatomic landmarks in nuclear medicine images, even when the images contain insufficient data to be diagnostically useful.", *Qian*, 2:7-11.

Regarding **claim 14**, claim 4 recites identical features as in claim 14. Thus, references/arguments equivalent to those presented above for claim 4 are equally applicable to claim 14.

Conclusion

[13] Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID P. RASHID whose telephone number is (571)270-1578. The examiner can normally be reached Monday - Friday 7:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-74155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/
Examiner, Art Unit 2624

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Examiner
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